METHODS

Sampling Design

In 1999, Montana used a disproportionate stratified sampling design (DSS)[3] for the BRFSS survey. In the DSS design, the universe of all Montana telephone numbers was disproportionately stratified by telephone blocks. A block consists of 100 phone numbers with consecutive four-digit telephone suffixes (e.g., 406-443-1100 to 406-443-1199). One-plus blocks (high-density stratum) are computer-generated listings of 100 consecutive telephone numbers containing at least one published household telephone number. Zero-blocks (low-density stratum) are listings of 100 consecutive telephone numbers containing no published household telephone numbers. To be representative, both one-plus and zero-plus blocks were randomly sampled, but at a disproportionate rate of 4:1. Once a residence was successfully contacted, individual respondents were randomly selected from all adults aged 18 and older living in the household. The selected adult was then interviewed in accordance with the BRFSS protocol (CDC 1998). In 1999, approximately 150 interviews were completed each month, for a yearly total of 1,798 interviews.

Interviews were conducted by Northwest Resource Consultants (Helena, MT) at facilities located at the Montana Department of Public Health and Human Services. Interviews were conducted during daytime and evening hours on Monday through Friday and during daytime hours on weekends to ensure that selected individuals had ample opportunity to participate in the survey. Fifteen efforts were made to reach a phone number at different times of the day and evening and on different days before being classified as an unreachable number. The Council of American Survey Research Organizations response rate estimate for 1999 was 71.7 percent. Five percent of completed interviews were verified by recontacting the respondent. Respondents selected for verification were contacted by an interviewer who did not conduct the original interview.

Data Weighting and Analysis

Data were weighted to account for differences in the probability of selection (e.g., households with more than one telephone number were more likely to be called). Post-stratification weighting based upon the population estimates for the 1999 Montana population was used to ensure that the results more closely reflected the adult population of Montana.

A comparison of the demographic characteristics of the 1999 survey sample with 1999 Census Bureau population estimates indicates that several population subgroups were either under- or over-represented in the samples (Table 2). Males and the 18 to 29 year-old age class were under-represented, while females and the 65-year-and-older age class were over-represented in the survey. Other subgroupings appear to have been sampled approximately according to their estimated occurrence in the population. The post-stratification weighting tends to correct for the apparent sampling error.

[3]*For a detailed description of BRFSS methodology, see the BRFSS Surveillance Guide, an online version of the BRFSS Users Guide at: http://www.cdc.gov/nccdphp/brfss/training.htm*

Table 2. Demographic Distribution of the 1999 Montana BRFSS Survey Sample and 1999 U.S. Census Bureau estimates for the Montana adult population.

Demographic Group	BRFSS Sample 1999	BRFSS Sample UW	BRFSS Sample Percent* (W)	1999 Census Bureau Estimate	Percent Total of Population
All Adults	1,798			658,960	
Sex:					
Male	768	42.7	(48.7)	323,506	49.1
Female	1,043	57.3	(51.3)	335,454	50.9
Age:					
18 - 29	280	15.6	(20.4)	136,823	20.8
30 - 34	516	28.7	(28.5)	184,056	27.9
45 - 64	614	34.1	(30.7)	220,842	33.5
65+	386	21.5	(19.3)	117,239	17.8
Unknown	2				
Education:					
<High School	175	9.7	(10.0)	Not available	
High School	619	34.4	(35.0)	Not available	
Some College	510	28.4	(27.4)	Not available	
College Degree	491	27.3	(27.5)	Not available	
Unknown	3				
Income:					
<$10,000	87	4.8	(3.8)	Not available	
$10,000 - $19,999	240	13.3	(11.8)	Not available	
$20,000 - $34,999	487	27.1	(26.7)	Not available	
$35,000 - $49,999	274	15.2	(15.3)	Not available	
$50,000+	314	17.5	(18.6)	Not available	
Unknown	396				
Race:					
White, non-Hispanic	1,671	92.9	(92.3)	611,503	92.8
Non-white or Hispanic	122	6.8	(7.2)	47,457	7.8
Unknown	5				

*Unweighted (UW) and weighted (W) percentages.

Respondents who indicated "don't know," "not sure," or "refused" were excluded from the calculation of prevalence estimates. The SPSS® statistical package (SPSS, Inc.) and the WesVar® Complex Samples™ module (Westat 1998) were used to compute prevalence estimates (expressed as percentages) and associated 95% confidence intervals using sample weights provided by CDC. Prevalence estimates based on denominators with fewer than 50 respondents were not reported due to their inherent low reliability.

Data Reliability and 95% Confidence Intervals

As noted earlier, the BRFSS data represent a sample of the Montana adult population. It is not feasible to query the entire Montana population, so the sample is used to estimate population prevalences for health-risk behaviors. The reliability of a sample statistic (e.g., prevalence) can be estimated by setting a confidence interval (sometimes referred to as the margin of error) around the statistic. By convention, 95% confidence intervals are generally used.

As an example, a prevalence estimate for cigarette smoking of 20% with a computed 95% confidence interval of ± 2%, translates to a lower limit of 18% and an upper limit of 22%. There is a 95% probability that the interval 19% to 23% includes the true percentage of smokers in the Montana population.

The width of a confidence interval (e.g., ± 2%) is dependent upon sample size. Estimates based on large samples have narrower confidence intervals and are more reliable than are estimates based on small samples. Confidence intervals must be considered when making comparisons among subgroups of the population (e.g., among age classes). Percentages for different subgroups of the population can be determined to be significantly different if their confidence intervals do not overlap. A statistical test is needed to determine if estimates are likely to be different when the confidence intervals overlap.

Analysis of subpopulations results in a concomitant lowering of sample size. The more subgroups into which the data are partitioned, the smaller the sample size per subgroup. The results presented in this report include some instances where sample sizes for subgroups within select populations (e.g., breast screening for women aged 50 and older or colorectal cancer screening among adults aged 50 and older) were too small, and the associated 95% confidence intervals too broad, to yield meaningful comparisons among subgroups.

Questionnaire

The BRFSS questionnaire has three parts: the core, consisting of the fixed core questions (asked every year), rotating core questions (asked in alternating years), and emerging core questions (asked for only one year); optional modules provided by CDC, any number of which can be selected by individual states for inclusion; and state-added questions (additional questions of specific interest to individual states).

All states must ask the core questions without modification in wording. As part of the core, in addition to questions on health-related behaviors, respondents are also asked to provide demographic information including sex, age, race, marital status, annual household income, employment status, and education level. Optional modules and state-added questions are added by individual states to their respective questionnaires.

The 1999 Montana BRFSS Questionnaire consisted of 189 questions. Not all respondents received all questions, since some questions pertain to a specific age group or sex, or persons with a particular condition (e.g., diabetes). The average length of time to administer the survey was 18 minutes in 1999.

Survey Limitations

Surveys that require self-reporting of data have limitations and should be interpreted with caution. Respondents may have the tendency to under-report behaviors that are socially undesirable, unhealthy, or illegal (e.g., drinking and driving or smoking), while over-reporting desirable behaviors (e.g., amount of exercise or regular health screening). The accuracy of self-reported information also is affected by the ability of respondents to fully recall past behaviors or health screening results.

Telephone surveys exclude households without telephones, which may result in a biased survey population due to under-representation of certain segments of the population. An estimated 96% of Montana households have at least one residential telephone. The four percent of homes without telephones may represent a population segment at high risk for preventable diseases associated with low socioeconomic status. The sampling procedures make no special effort to reach populations among which telephone lines per capita is lower than the norm.